

CLAIMS:

1. A telescopic shaft for vehicle steering which is installed in a steering shaft of a vehicle and in which a male shaft and a female shaft are
5 fitted to each other to be unrotatable and freely slidable, characterized in that:

a first torque transmitting member is interposed between at least one of axial grooves which are respectively formed on the outer peripheral surface
10 of said male shaft and on the inner peripheral surface of said female shaft through an elastic member;

a second torque transmitting member is interposed between at least another of axial grooves
15 which are respectively formed on the outer peripheral surface of said male shaft and on the inner peripheral surface of said female shaft; and

said elastic member comprises:

a contact portion on the transmitting member
20 side which is in contact with said first torque transmitting member;

a contact portion on the groove surface side which is separated from said contact portion on the transmitting member side by a predetermine distance
25 in a substantially circumferential direction and, at the same time, in contact with the groove surface of the axial groove of said male shaft or said female

shaft; and

a biasing portion for elastically biasing said contact portion on the transmitting member side and said contact portion on the groove surface side in a direction in which both the contact portions are separated from each other.

2. A telescopic shaft for vehicle steering according to claim 1, wherein:

10 said first torque transmitting member comprises a rolling member which is rotated when both the shafts are moved relatively to each other in the axial direction; and

15 said second torque transmitting member comprises a sliding member which slides in a slip manner when both the shafts are moved relatively to each other in the axial direction.

3. A telescopic shaft for vehicle steering according to claim 1 or 2, wherein the biasing portion of said elastic member is in a folded-back form which is folded back between the contact portion on the transmitting member side and the contact portion on the groove surface side.

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4. A telescopic shaft for vehicle steering according to any one of claims 1 to 3, wherein:

the axial groove of said male shaft or said female shaft comprises a flat-shaped side surface which is in contact with the contact portion on the groove surface and a bottom surface which is
5 connected to said flat-shaped side surface;

said elastic member has a bottom portion opposed to said bottom surface of said axial groove; and

the bottom portion of said elastic member is arranged to be in a state of contacting with said
10 bottom surface of said axial groove, or the bottom surface of said axial groove is set to be separated from the bottom portion of said elastic portion by a predetermined distance.

15 5. A telescopic shaft for vehicle steering according to any one of claims 1 to 4, wherein the biasing portion of said elastic member is separately provided from the contact portion on said transmitting member side and the contact portion on
20 the groove surface side, and is formed of a material different therefrom.

25 6. A telescopic shaft for vehicle steering according to any one of claims 1 to 4, wherein said elastic member has, in addition to said contact portion on the transmitting member side, said contact portion on the groove surface side and said biasing

portion, a second biasing portion which is separately formed of a material different therefrom.

7. A telescopic shaft for vehicle steering
5 according to any one of claims 1 to 6, wherein said elastic member comprises a leaf spring.

8. A telescopic shaft for vehicle steering
according to claim 6 or 7, wherein said biasing
10 member separately formed of a different material and said second biasing member also separately formed of a different material are formed of rubber or synthetic resin.

15 9. A telescopic shaft for vehicle steering according to any one of claims 1 to 8, wherein a lubricating agent is applied between said axial groove of the male shaft, said axial groove of the female shaft, said elastic member and said first
20 torque transmitting member.

10. A telescopic shaft for vehicle steering according to any one of claims 1 to 8, wherein a predetermined gap is provided among said male shaft,
25 said second torque transmitting member and said female shaft and the relation of $A > B$ is satisfied when a rotatable angle among said male shaft, said

elastic member, said first torque transmitting member
and said female shaft in the circumferential
direction of the male shaft is A, and an angle of
rotation of said gap among said male shaft, said
5 second torque transmitting member and said female
shaft in the circumferential direction of the male
shaft is B.

11. A telescopic shaft for vehicle steering
10 according to claim 10, wherein said angle of rotation
B of the male shaft for said predetermined gap is set
within a range from 0.01° to 0.25° .